



LARVAL SOURCE MANAGEMENT

A supplementary measure for malaria vector control

AN OPERATIONAL MANUAL

The World Health Organization is launching an operational manual to provide advice to National Malaria Control Programmes on the sound management of mosquito larval habitats. The manual provides step-by-step guidance on the planning, implementation, management and evaluation of larval source management programmes, and updates all previous WHO technical recommendations on this subject.

What is larval source management?

Larval source management (LSM) refers to the targeted management of mosquito breeding sites, with the objective to reduce the number of mosquito larvae and pupae. LSM is only recommended as a *supplementary* malaria vector control measure; it should not be used to replace core vector control interventions, such as long-lasting insecticidal nets (LLINs) and indoor residual spraying (IRS).

There are four main types of LSM:

- 1) habitat modification, which means a permanent alteration to the environment, e.g. land reclamation or surface water drainage;
- 2) habitat manipulation, which refers to a recurrent activity e.g. water-level manipulation, flushing of streams, the shading or exposure of habitats;
- 3) larviciding, which involves the regular application of a biological or chemical insecticide to water bodies; and
- 4) biological control, which refers to the introduction of natural predators into water bodies, for example predatory fish or invertebrates.

In general, LSM programmes need to be fully tailored to local environmental conditions and should be based on comprehensive feasibility and cost-effectiveness studies. Similarly to core vector control interventions, the management of larval habitats is a major financial and technical undertaking, requiring both community support and long-term political commitment.

Key facts

Malaria is an entirely preventable and treatable vector-borne disease. Its transmission occurs in 99 countries, with an estimated 3.3 billion people at risk.

WHO estimates that 219 million cases of malaria occurred worldwide in 2010 (uncertainty range: 154 million to 289 million) and about 660 000 people died from the disease (uncertainty range: 490 000 to 836 000), mostly children under five years of age in sub-Saharan Africa.

During the last ten years, over a million lives have been saved as a result of expanded malaria control, in particular through the use of LLINs and IRS. In Africa, malaria mortality rates were reduced by an estimated 33%. To protect these gains, core vector interventions (LLINs and IRS) need to be maintained and further scaled up.

The effective management of larval habitats requires a cadre of trained field personnel, entomologists and public health professionals, with detailed knowledge of local malaria transmission and vector control. For these programmes to succeed, large-scale programme management capa-

city is also critical, including the ability to collate, synthesize and report monitoring data, and the ability to manage human resources and logistics.

When appropriately used, LSM can contribute to reducing the numbers of both indoor and outdoor biting mosquitoes, and – in malaria elimination phase – it can be a useful addition to programme tools to reduce the mosquito population in remaining malaria ‘hotspots’. Where appropriate, it can also help programmes to reduce their overall dependence on insecticides, thereby making a contribution to preventing the emergence of insecticide resistance. LSM can also be useful to help control other vector-borne diseases, especially dengue.

Limits of larviciding

In recent years, there has been a visible expansion of larviciding programmes in Africa, with the aim to eliminate malaria-carrying mosquitoes in an environmentally friendly manner. Although there are numerous accounts of successful programmes, there are many examples of failure, rooted primarily in the incorrect targeting and application of larviciding products. Some countries have even started diverting funds from core vector control interventions, which has been of concern to WHO.

As this new operational manual explains, larviciding – as all other larval source management measures – *only has limited applicability* in malaria vector control. WHO only recommends larviciding in areas where mosquito breeding sites are *few, fixed and findable*, and where the sites are easy to identify, map and treat. This intervention can be particularly useful in urban and peri-urban areas, but it is unlikely to be effective in most rural settings in Africa, where breeding sites are generally innumerable, shifting, and widely dispersed.

The safety and efficacy of larval control products is of critical importance. Within WHO, it is the WHO Pesticide Evaluation Scheme (WHOPES) that coordinates the assessment of larval control compounds and formulations. WHO encourages endemic countries to procure WHOPES-recommended products; the use of non-recommended products may have adverse impacts on human health and the environment. In March 2012, WHO issued a position statement on

larviciding in sub-Saharan Africa, which has since been distributed to all National Malaria Control Programmes.

About the operational manual

The operational manual has been designed primarily for National Malaria Control Programmes as well as field personnel. It will also be of practical use to specialists working on public health vector control, and malaria programme specialists working with bilateral donors, funders and implementation partners. It has been written by senior public health experts of the malaria vector control community under the guidance of the WHO Global Malaria Programme.

The manual’s three main chapters provide guidance on 1) the selection of larval control interventions, 2) the planning and management of larval control programmes, and 3) detailed guidance on conducting these programmes. The manual also contains a list of WHOPES-recommended formulations, standard operating procedures for larviciding, as well as a number of country case studies.

For further information, contact:

WHO Global Malaria Programme

Vector Control Unit

Email: gmpvectorcontrol@who.int

Web: www.who.int/malaria